

What is claimed is:

1. A method for creating multi-layered metal interconnects, comprising:

providing a substrate, semiconductor devices having been created in or over the substrate, at least one point of electrical contact having been provided over the substrate;

creating a first layer of metal comprising at least one first level metal interconnect in a first direction having an ending and a there-with associated end surface;

defining a channel over the first layer of metal having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surface; and

creating at least one additional layer of metal, comprising at least one metal interconnect not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction.

2. The method of claim 1, said at least one additional layer of metal further comprising at least one via over said end surface area of said at least one first level metal interconnect and making contact there-with

3. The method of claim 1, said at least one additional layer of metal further comprising at least one interconnect between said at least one first level metal interconnect and said at least one via.

4. The method of claim 1, wherein:

said first layer of metal comprising multiple first level metal interconnects in a first direction having endings and there-with associated end surfaces, said end surfaces of said multiple first level metal interconnects being linearly positioned; and

said at least one additional layer of metal comprising overlying levels of interconnect metal, comprising metal interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction.

5. The method of claim 4, said overlying levels of interconnect metal further comprising multiple vias over said end surfaces of said multiple first level metal interconnects and making contact with a sub-set thereof.

6. The method of claim 4, said overlying levels of interconnect metal further comprising interconnects between said multiple first level metal interconnects and said multiple vias.

7. The method of claim 4, wherein said metal interconnects not overlying said channel are stacked and parallel.

8. The method of claim 1, wherein:

said first layer of metal comprising multiple first level metal interconnects in a first direction having endings and there-with associated end surfaces, said end surfaces of said multiple first level metal interconnects being linearly positioned; and

said additional levels of interconnect metal comprising metal interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction, metal interconnects of additional levels of interconnect metal being stacked and parallel.

9. The method of claim 8, said additional levels of interconnect metal further comprising at least one joining interconnect between metal of a level of interconnect and a surface area of said level of interconnect that is located over an end surface of said first layer of metal.

10. The method of claim 8, said additional levels of interconnect metal further comprising at least one via connecting said joining interconnect with said end surface of said first level metal interconnects.

11. The method of claim 1, wherein:

said first layer of conductive material comprising at least one first level conductive interconnect in a first direction having an ending and a there-with associated end surface; and

said at least one additional layer comprising at least one overlying layer of conductive material, comprising at least one overlying conductive interconnect not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction.

12. The method of claim 11, said at least one overlying layer of conductive material further comprising at least one conductive via over said end surface area of said at least one first level metal interconnect and making contact there-with.

13. The method of claim 11, said at least one overlying layer of conductive material further comprising at least one conductive interconnect between said at least one first level conductive interconnect and said at least one conductive via.

14. The method of claim 1, wherein:

said first layer of conductive material comprising multiple first level conductive interconnects in a first direction having an ending and there-with associated end surfaces, said end surfaces of said multiple first level conductive interconnects being linearly positioned;

said overlying levels of conductive interconnects comprising conductive interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction.

15. The method of claim 14, said overlying levels of conductive interconnects further comprising multiple conductive vias over said end surface area of said multiple first level conductive interconnects and making contact with a sub-set thereof.

16. The method of claim 14, said overlying levels of conductive interconnects further comprising interconnects between said multiple first level conductive interconnects and said multiple conductive vias.

17. The method of claim 14, wherein said conductive interconnects not overlying said channel are stacked and parallel.

18. The method of claim 1, wherein:

said first layer of conductive material comprising multiple first level conductive interconnects in a first direction having endings and there-with associated end surfaces, said end surfaces of said multiple first level conductive interconnects being linearly positioned; and

said additional levels of conductive interconnects comprising conductive interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction, conductive interconnects of additional levels of conductive interconnects being stacked and parallel.

19. The method of claim 18, said additional levels of conductive interconnects further comprising at least one joining conductive interconnect between conductive material of a level of conductive interconnects and a surface area of said level of conductive interconnects that is located over an end surface of said first layer of conductive material.

20. The method of claim 18, said additional levels of conductive interconnects further comprising at least one conductive via connecting said joining conductive interconnect with said end surface of said first layer of conductive material.

21. A method for creating multi-layered metal interconnects, comprising:

providing a substrate, semiconductor devices having been created in or over the substrate, at least one point of electrical contact having been provided over the substrate;

creating at least one layer of interconnect metal over the substrate, comprising:

(i) a first layer of metal comprising at least one first level metal interconnect in a first direction having an ending and a there-with associated end surface;

(ii) a channel defined over the first layer of metal having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surface; and

(iii) at least one additional layer of metal, comprising at least one metal interconnect not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction.

22. The method of claim 21, said at least one additional layer of metal further comprising at least one via over said end surface area of said at least one first level metal interconnect and making contact there-with.

23. The method of claim 21, said at least one additional layer of metal further comprising at least one interconnect between said at least one first level metal interconnect and said at least one via.

24. A method for creating multi-layered conductive interconnects, comprising:

providing a substrate, semiconductor devices having been created in or over the substrate, at least one point of electrical contact having been provided over the substrate;

creating at least one layer of conductive interconnects over the substrate, comprising:

(i) a first layer of conductive material created comprising at least one first level conductive interconnect in a first direction having an ending and a there-with associated end surface;

(ii) a channel defined over the first layer of metal having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surface;

(iii) at least one additional layer of conductive material, comprising at least one conductive interconnect not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction.



25. The method of claim 24, said at least one additional layer of conductive material further comprising at least one conductive via over said end surface area of said at least one first level conductive interconnect and making contact there-with.

26. The method of claim 24, said at least one additional layer of conductive material further comprising at least one conductive interconnect between said at least one first level conductive interconnect and said at least one conductive via.

27. A structure of multi-layered metal interconnects, comprising:

- a substrate, semiconductor devices having been created in or over the substrate, at least one point of electrical contact having been provided over the substrate;

- a first layer of metal comprising at least one first level metal interconnect in a first direction having an ending and a there-with associated end surface;

- a channel having been defined over the first layer of metal having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surface;

- at least one overlying layer of metal, comprising:

(i) at least one overlying metal interconnect not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction;

(ii) at least one via over said end surface area of said at least one first level metal interconnect and making contact there-with; and

(iii) at least one interconnect between said at least one first level metal interconnect and said at least one via.

28. A structure of multi-layered metal interconnects, comprising:

a substrate, semiconductor devices having been created in or over the substrate, at least one point of electrical contact having been provided over the substrate;

at least one layer of interconnect metal over the substrate, comprising:

(i) a first layer of metal created comprising at least one first level metal interconnect in a first direction having an ending and a there-with associated end surface;

(ii) a channel defined over the first layer of metal having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surface;

(iii) at least one additional layer of metal, comprising:

(a) at least one metal interconnect not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction;

(b) at least one via over said end surface area of said at least one first level metal interconnect and making contact there-with; and

(c) at least one interconnect between said at least one first level metal interconnect and said at least one via.

29. A structure of multi-layered metal interconnects, comprising:

a substrate, semiconductor devices having been created in or over the substrate, points of electrical contact having been provided over the substrate;

a first layer of metal comprising multiple first level metal interconnects in a first direction having an ending and there-with associated end surfaces, said end surfaces of said multiple first level metal interconnects being linearly positioned;

a channel having been defined over the first layer of metal having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surface;

overlying levels of interconnect metal, comprising:

(i) metal interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction;

(ii) multiple vias over said end surface area of said multiple first level metal interconnects and making contact with a sub-set thereof; and

(iii) interconnects between said multiple first level metal interconnects and said multiple vias.

30. The structure of multi-layered metal interconnects of claim 29, wherein said metal interconnects not overlying said channel are stacked and parallel.

31. A structure of multi-layered metal interconnects, comprising:

a substrate, semiconductor devices having been created in or over the substrate, points of electrical contact having been provided over the substrate;

a first layer of metal comprising multiple first level metal interconnects in a first direction having an ending and there-with associated end surfaces, said end surfaces of said multiple first level metal interconnects being linearly positioned;

a channel defined over the first layer of metal having a central axis perpendicularly intersecting with said first

direction further having borders separated from said central axis by a distance, said central axis overlying said end surface; and

additional levels of interconnect metal, comprising:

(i) metal interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction, metal interconnects of additional levels of interconnect metal being stacked and parallel;

(ii) at least one joining interconnect between metal of a level of interconnect and a surface area of said level of interconnect that is located over an end surface of said first layer of metal; and

(iii) at least one via connecting said joining interconnect with said end surface of said first layer of metal.

32. A structure of multi-layered conductive interconnects, comprising:

a substrate, semiconductor devices having been created in or over the substrate, points of electrical contact having been provided over the substrate;

a first layer of conductive material comprising multiple first level conductive interconnects in a first direction having an ending and there-with associated end surfaces, said end

surfaces of said multiple first level conductive interconnects being linearly positioned;

a channel having been defined over the first layer of conductive material having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surface;

overlying levels of conductive interconnects, comprising:

(i) metal interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction;

(ii) multiple conductive vias over said end surface area of said multiple first level conductive interconnects and making contact with a sub-set there-of; and

(iii) interconnects between said multiple first level conductive interconnects and said multiple conductive vias.

33. The structure of multi-layered metal interconnects of claim 32, wherein said metal interconnects not overlying said channel are stacked and parallel.

34. A structure of multi-layered conductive interconnects, comprising:

a substrate, semiconductor devices having been created in or over the substrate, points of electrical contact having been provided over the substrate;

a first layer of conductive material comprising multiple first level conductive interconnects in a first direction having an ending and there-with associated end surfaces, said end surfaces of said multiple first level conductive interconnects being linearly positioned;

a channel defined over the first layer of conductive material having a central axis perpendicularly intersecting with said first direction further having borders separated from said central axis by a distance, said central axis overlying said end surfaces; and

additional levels of conductive interconnects, comprising:

(i) conductive interconnects not overlying said channel in a second direction, said second direction perpendicularly intersecting with said first direction, conductive interconnects of additional levels of interconnect metal being stacked and parallel;

(ii) at least one joining conductive interconnect between conductive material of a level of conductive interconnect and a surface area of said level of conductive interconnect that is located over an end surface of said first layer of conductive interconnects; and

(iii) at least one conductive via connecting said joining conductive interconnect with said end surface of said first layer of conductive interconnects.